ABT Automated Baghandling and Shiploading Terminal, 1996 OCEA

The Port of Galveston was was the home of the first fully integrated automated grain handling system in the United States – the Automatic Baghandling and Shiploading Terminal (ABT). The project utilized innovative dockside unitizers and innovative design and construction techniques including four different piling systems, bulkhead system, dock extension, and the integration of existing transit sheds, silos and wharfs (that had been originally constructed in 1925). While the facility was being constructed in Galveston, the dockside unitizers were being constructed in Belgium; they were then shipped fully assembled and ready to set into place. The ABT was then connected to bulk transfer areas for automated bagging of loose grain products by the dock-side rail system and a conveyance system above the second-floor gallery of an existing transit shed.

Engineers designed the ABT to match the color scheme and historic feel of the adjacent port facilities - fully integrating it into the 1925 architecture. Construction of the facility was challenging because piling foundations had to be placed under an existing wharf and inside an aging warehouse. Engineers were able to achieve this feat by cutting holes into the roof of the structure and driving pipe piles at the floor slab level inside the warehouse. They did this 5-feet at a time, welding another 5 feet to the pile, and starting the process over again; they drove 1,000 feet of piling in this manner. Interestingly, of the project's $33-million price-tag, $32.65 million was covered by private investors - a venture which was recognized in *Project Finance Monthly*'s "top 24 financed projects in the world" in 1995 and which provided untold economic benefit to the City of Galveston and surrounding taxing authorities as well as agricultural communities in the Midwest, and to the US balance of trade.

Owner:	ABT Management Inc.
Engineer:	Sylva Engineering Corporation
Contractor:	Turner Construction Company

Pierce Elevated Reconstruction, 1998 OCEA

The Pierce Elevated is a major arterial freeway in the Central Business District of Houston. Thirty years after it was opened, the wear and tear of years of supporting 100,000 more vehicles daily than it was originally designed for gave rise to frequent shutdowns and resulted in ever-increasing repair costs (averaging $500,000 per year). The reconstruction project involved removing the existing roadway, replacing beams and caps with precast units, and constructing new deck panels and guardrails. Traylor Brothers was awarded the contract and completed the project in 160 days (thirty days early), earning an early completion bonus of $1.6 million - a record high for TxDOT.

Time savings were achieved through drill innovations, the use of cranes to place precast elements instead of conventional caps casting, and an hour-by-hour schedule for project management. The $30,000 special gang drill was built specifically for the Pierce Elevated Reconstruction. It simultaneously completed four five-foot deep holes down into each column and placed the 1 to 1 ¾ inch diameter reinforcing steel that would be epoxy grouted and tied to the new pier cap, taking only 10 minutes to complete each column. Motorists' fears of traffic delays and congestion were dispelled as the project provided excellent re-routing while an outside advertising agency kept the public well-informed of the details of the road closure and alternate routes.

Owner:	Texas Department of Transportation (TxDOT)
Engineer:	Houston District Engineer, Gary Trietsch PE
Contractor:	Traylor Brothers

White Rock Lake Reclamation, 1999 OCEA

White Rock Lake, located approximately 5 miles from downtown Dallas became the city's first public surface water supply when it was built in 1911. The 1,100-acre lake is the centerpiece of the 2,100-acre White Rock Lake Park - a local favorite for jogging, fishing, sailing, and picnicking - amongst other activities. However, prior to the Reclamation project, this landmark resource was being threatened by years of sediment build-up. Dallas citizens, city officials, and engineering professionals supported a dredging and restoration project which was completed in 1999.

Project engineers showed resourcefulness in managing the various problems that arose, including disposal of 3,000,000 cubic yards of material (enough to cover a 300-acre area, six-foot deep) and proximity to park facilities and urban surroundings. Detailed hydraulic analysis and effective project management made possible the piping of sediment slurry a record distance of 17 miles, which was a feat most dredging contractors had previously thought impossible. The project, having become the longest pipeline dredging project ever attempted in the U.S., was completed on time and within budget without any negative impact to the environment or adjacent neighborhoods.

Austin-Bergstrom International Airport, 2000 OCEA

At groundbreaking in November 1994, the Austin-Bergstrom International Airport was the largest project undertaken by the City of Austin. It has become an incredible asset to the City of Austin, both for its much-needed expansion of air traffic facilities and for its elimination of the costs associated with maintaining the decommissioned Bergstrom Air Force Base. Conversion of the Air Force Base was a $750-million investment and consisted of a 25-gate passenger terminal, a 10,500-space parking facility, a new 9,000 foot concrete runway and parallel taxiway, environmental cleanup of over 480 hazardous material sites left by the Air Force, and recycling of over 350,000 tons of former Air Force base airfield concrete. Transfer of air traffic from the existing Robert Mueller Municipal Airport to the new facility reduced noise impact on people from 30,000 to less than 2,000 and saved over $50 million in sound insulation costs.

In order to contain costs and minimize environmental impact, engineers were careful in their assessment of which new structures to build and which to keep and modify. They were, for example, able to reuse a 12,250 ft Air Force runway by adding a new lighting system and runway grooving and constructing a new connecting taxiway - saving 75% of the cost of building a new one. Additionally, engineers had the challenge of designing and constructing facilities around, threw, over, and under functional areas of the airport in order to keep them open during construction. The facility was designed to have minimal environmental impact by incorporating green building practices such as the reuse and recycling of existing infrastructure, the use of local building materials, and minimal depletion of natural resources in facilities use (e.g. use of a unique thermal storage system to cool the Barbara Jordan Passenger Terminal). In recognition of these efforts, the FAA Southwest Region awarded Austin-Bergstrom their 1997 Environmental Achievement Award.

Owner:	City of Austin, Department of Aviation
Engineer/Architect:	Page, Southerland, Page, LLP
Contractor:	Morganti National
Photo:	Wikipedia- LonestarMike

IH-30/IH-35W Interchange, 2003 OCEA

The development of the IH-30/IH-35W Interchange was in response to a need for extra lanes as well as structural improvements to the existing design. Instead of making changes to the existing facility, the decision was made to eliminate the existing overhead freeway and build a new section of I-30 to the south. This alternative was chosen from a comprehensive analysis, comprising 15 alternatives, including preliminary engineering, environmental studies, and artist renderings, which had been prepared by Turner Collie & Braden Inc. The, so named, “Vickery Alternative” was well-supported by citizens’ groups who favored it for promoting “aesthetic value and economic vitality” by reuniting the southern end of downtown with the central business district and providing unobstructed views of three important historic buildings: the U.S. Post Office, the Texas & Pacific Railroad (T&P) Building, and the T&P Warehouse (all circa 1920s); as well as the renowned Fort Worth Water Gardens.

The plan involved both the reconstruction of the existing interchange and re-aligning and re-routing of four miles of Interstate Highway. The final design also accommodated the T&P Railroad’s plan to provide commuter rail adjacent to the interchange and newly re-routed overhead. TxDOT and the T&P were able to share use of the right-of-way through extensive use of straddle bents in the IH-30 bridges. This project was remarkable for extensive efforts to gain input from every segment of the interested public, and its departure from standard highway design practice in finding the best solution for the broader needs of the community. Through innovation in sequencing of final design and construction – wherein construction began on the first phases before the final design of the remaining phases was complete – construction of the project was accelerated by several years. The entire project was completed in April of 2003 at a cost of $172.6 million. It received the Texas Section OCEA Award of Merit in 2004.

Owner:	Texas Department of Transportation, Fort Worth District
Engineers:	District Engineer, J.R. Stone PE
	Design Engineer, Billy Hardie PE
	Consulting Engineer, Turner Collie & Braden Inc.
Sub-contractors:	A.R.S. Engineers Inc., and SWA Group

Lamar Boulevard Street Reconstruction from Town Lake to 24th Street, 2006 OCEA

This project was an important milestone for the engineering profession, having established a ground-breaking new approach to processes for design and construction of horizontal projects, involving a new way of organizing private-public resources. In collaboration, the City of Austin and Lockwood Andrews & Newman (LAN) developed an Accelerated Design and Construction Process (ADCP) for horizontal construction. While traditionally, alternative delivery systems had been utilized in vertical construction and for massive multi-billion dollar projects, this alternative delivery system maintains traditional design-bid-build elements while accelerating project completion through innovative accelerated management and processes, e.g. contract requirements, planned phasing process, construction materials and methodology. Through implementation of the ADCP, the typical design schedule of utility replacement and street reconstruction was reduced by 50%. Additionally, careful co-ordination and collaboration between organizations and departments resulted in added scope of the project - doubling the amount of design originally involved. The ADCP represents entirely new ways of thinking about process development in the more average construction value projects within the aging inner core of our cities.

An example of process innovation in this project's construction methodology is that an on-site field engineer was made available throughout the construction process to review sidewalk and construction design and accommodate field changes into the overall plan. Additionally, project engineers met with City staff frequently throughout project development, which resulted in a design that met the city's goals, a set of contract documents prepared within the time constraints and a construction schedule and process that met the budget and needs of local businesses. An additional benefit of early planning that expedited construction was the specification that the contractor would televise wastewater lines to locate service laterals – a provision that saved critical days from the schedule. The $13.5 million Lamar Boulevard Reconstruction project was completed September 10, 2004 - ten months ahead of schedule and having become the City of Austin's new standard for utility replacement and pavement reconstruction projects in high-profile areas.

Owner:	City of Austin, Public Works Department
Engineers:	Lockwood Andrews and Newman Inc.
	HVJ Associates Inc.
Contractor:	Capital Excavation

IH35/US290 (SH71) Ben White Interchange, 2008 OCEA

IH35 is an important and well-traveled north-south route that connects Mexico directly to trade centers in the Midwestern states and accommodates some of the largest traffic counts in Texas through Austin (~100,000). US290 is part of the National Highway System – a principal east-west arterial through the south side of Austin. The Interchange provides much needed traffic congestion relief through what was formerly an intersection controlled by traffic lights. The interchange is a fully-directional 5-level stack which, at its initial completion, included four direct connectors (four additional ramps added in 2011). Design of the elevated direct connections included bi-furcated steel units for the steel trapezoidal beams at the diverging core. This element was a first for TxDOT and the State of Texas. The design facilitated all specifications while not altering alignment of traffic lanes underneath the connectors. The bi-furcated units also allowed for less straddle bents and reduced associated structural steel costs.

Phased sequencing methods used during construction were remarkable for innovation, cost-efficiency, and schedule reduction. For example, the main alignment was offset to allow the entire northbound main lane bridge to be constructed in one phase; the northbound bridge was constructed at a slightly wider than required width to allow all six lanes of main lane traffic to be shifted to the new bridge during construction of the southbound main lane structure. Traffic flow was maintained during construction and these methods significantly reduced the construction timeline and number of phases. Additional features include aesthetic treatments in a “Capital of Texas” theme with Lone Star castings on bridge columns, tiered retaining walls, brick paver treatments, terracing, and landscaping throughout.

Owner:	Texas Department of Transportation (TxDOT)
Engineer:	HNTB Corporation
Contractor:	J.D. Abrams LP